

NON-PUBLIC?: N
ACCESSION #: 9510110239
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Kewaunee Nuclear Power Plant PAGE: 1 OF 8

DOCKET NUMBER: 05000305

TITLE: Spurious Reactor Trip During Surveillance Testing
EVENT DATE: 09/05/95 LER #: 95-005-00 REPORT DATE: 10/05/95

OTHER FACILITIES INVOLVED: Kewaunee DOCKET NO: 05000

OPERATING MODE: POWER LEVEL:

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR
SECTION:
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
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Ext. 2559
COMPONENT FAILURE DESCRIPTION:
CAUSE: X SYSTEM: JC COMPONENT: 94 MANUFACTURER: W120
REPORTABLE NPRDS: N

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

On September 5, 1995 with the reactor at 96 percent power, Surveillance Procedure (SP) 47-010A, "Channel 1 (Red) Reactor Coolant Temperature and Pressurizer Pressure Instrument Channel Test," was being performed. SP 47-010A is performed monthly. During performance of the procedure, a spurious reactor trip occurred. With the exception of erratic indication on one of the two source range nuclear instruments, the plant response to the trip was as expected.

The cause of the trip is suspected to have been a misaligned contact on a trip relay which completed the two out of four trip logic when one channel of the Pressurizer (PZR) Low Pressure trip logic was tripped in as part of the SP test sequence. This is a suspected condition since inspections, testing, and computer and sequential event recorder printout reviews did not confirm that a trip signal from low pressure was initiated. Subsequent to the trip, a repeat performance of the SP could not reproduce a trip condition.

Subsequent to performing a test of the reactor protection logic relays on the train suspected to have caused the trip, and all four of the reactor coolant temperature and PZR pressure channels, the plant was returned to power and placed on-line. The testing performed confirmed that no trip signals existed to prevent a start-up and or result in a similar occurrence.

END OF ABSTRACT

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DESCRIPTION OF EVENT

This report describes a spurious reactor RCT! trip that occurred at 0838 on September 5, 1995. The trip occurred, with the reactor at 96 percent power, during performance of Surveillance Procedure (SP) 47-010A, "Channel 1 (Red) Reactor Coolant Temperature and Pressurizer Pressure Instrument Channel Test."

SP 47-010A tests the protection circuitry associated with the reactor coolant system temperature and pressurizer PZR! pressure on a monthly frequency. This procedure tests one of the four channels required to provide the two out of four reactor trip protection JC! logic. As part of the test sequence, the PZR low pressure protection trip relay 94! bistable is placed in the tripped condition for the channel under test. This action results in one of the two signals required to initiate a trip. Prior to tripping the bistables, the Instrument & Control (I&C) personnel performing the test, confirmed no control room indications of any other trip signals existed. At the step in the procedure when the red channel PZR low pressure bistable was placed in the tripped condition, a reactor trip occurred.

Upon identifying that a reactor trip had occurred, the operating crew entered Integrated Plant Emergency Operating Procedure E-0, "Reactor Trip or Safety Injection." The plant response to the trip, with the exception of erratic indication on one of the two source range nuclear instruments IG!, was as expected. No problems were encountered by the operators while performing the reactor trip response and recovery

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procedures. The erratic source range indication did not impact the plant response to the trip or impede the operators in performance of trip response or recovery actions.

Upon identifying that a trip had occurred when the PZR pressure bistable was tripped, I&C personnel reaffirmed that they had tripped in the proper channel. Subsequent reviews of the post-trip computer ID! and sequential event recorder (SER) IQ! printouts confirmed the proper bistables were in the tripped condition. There were no personnel errors involved in this event.

As part of the post-trip review, reviews of the plant process computer and SER printouts were performed. These reviews normally would provide the indication of the trip signal that initiated the trip. However, in this case, the only trip signals that were present were those that were initiated as part of the SP. The computer and SER recorded trip signals were not enough to make up the logic necessary to cause a trip to occur. Therefore, it was postulated that a contact was misaligned which caused an additional trip relay actuation signal. Subsequent to the trip, and as part of the corrective actions taken to determine the cause, an inspection was performed of the relay contacts which could have been misaligned. This inspection could not confirm the postulated contact condition. The misaligned contact was not able to be specifically identified due to the pressure transient induced by the plant trip causing the relays to actuate. The transient induced by the trip is a normal response, and the actuation of the relays is suspected to have corrected the misaligned contact.

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After the plant was stabilized and the trip recovery had been complete, the I&C group performed tests on the B train reactor protection logic system. B train was the one with the suspected misaligned contact. This was determined during reviews of the post-trip data which indicated that the B reactor trip breaker had tripped first during the event. This indicates the B reactor trip protection relay was the initiating signal. The logic testing was performed in accordance with SP 47-062B, "Reactor Protection Logic Train B Test." Testing was also performed on the B reactor trip breaker. This testing was done to confirm that the breaker undervoltage (UV) relay 27! setpoint had not drifted and contributed to the trip. Preventive Maintenance Procedure (PMP) 47-01, "Reactor Control and Protection (RCP) QA-1 Reactor Trip Breaker Maintenance," was used to perform the breaker test. These tests and maintenance activities confirmed satisfactory protection logic and breaker performance.

The final testing conducted was on all four channels of the reactor coolant temperature and PZR pressure protection circuits, with the performance of SPs 47-010A through D. All the testing performed confirmed that the trip condition was cleared and that no misaligned contacts were present prior to a restart of the reactor.

CAUSE OF THE EVENT

The root cause of the trip could not be conclusively determined. The cause of the trip is suspected to have been a misaligned relay contact in the B train PZR low pressure reactor trip circuitry. The

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misaligned contact along with the tripping in of the PZR low pressure red channel trip relay during performance of SP 47-010A is suspected to have made up the required two out of four logic to initiate the reactor trip. The misaligned contact could not be confirmed through post-trip data reviews, inspections, and testing of the protective trip circuitry. Although the actual reactor trip initiator could not be confirmed, the engineering and craft assessment of the suspected condition has deemed this the most probable cause of the trip.

ANALYSIS OF THE EVENT

This event is reportable in accordance with 10CFR50.73(a)(2)(iv) as an event that resulted in the actuation of the reactor protection system. This event was also reported in accordance with 10CFR50.72(b)(2)(ii) at 1132 CDT on September 5, 1995.

The reactor trip is believed to have occurred due to an misaligned PZR low pressure relay contact coincident with the PZR low pressure trip signal actuated as part of a surveillance task.

Integrated emergency operating procedure E-0, "Reactor Trip or Safety Injection," was implemented, and with the exception of erratic indication on one of the two source range nuclear instruments, all plant systems responded as designed. The suspected failure initiated a reactor trip, and the reactor protection system

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operated as designed. Since all systems functioned as designed and only the indication of the noted nuclear instrument was impacted and nothing unusual or not understood occurred, this event had no safety significance.

CORRECTIVE ACTIONS

The following corrective actions have been taken:

1. The affected protection channels have been inspected and tested to ensure the suspected trip initiator has cleared and the circuitry is operating as designed.
2. An evaluation of the suspected trip initiator (i.e. misaligned contacts) has been deemed the most probable source of the trip.
3. The B reactor trip breaker UV relay has been tested to ensure setpoint drift did not contribute to the trip.

Revisions to the logic test procedures, SP 47-062A and B, are also being initiated. The intent of these SPs is to perform a test of the logic circuits to assure adequate operation of reactor protection relays and assure reactor protection actuation logic matrices. Steps are being added to positively confirm that a trip

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relay circuit is not left in an actuated condition subsequent to testing the relays. This is a conservative action being taken as an additional step to provide assurance that the suspected trip initiator will be precluded from recurrence. The procedures previously did not have a step to confirm that relay contacts returned to their required position following testing. This is not considered a deficiency in the adequacy of the procedure. The additional steps to be added are considered conservative actions to take to preclude the type of event initiator that is suspected to be the cause of the subject trip.

ADDITIONAL INFORMATION

Equipment Failures:

Although unconfirmed, one of the B train PZR low pressure reactor protection trip relays is suspected to have failed. The suspected failure was a misaligned contact which caused the two out of four reactor protection trip logic to be completed while performing surveillance on the PZR low pressure trip circuitry.

One of the two source range nuclear instruments indication was erratic. This was only a problem with indication, the protective features of the instrument were still fully capable of performing their intended functions.

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Similar Events:

Subsequent to this event, while performing the next scheduled surveillance test of the reactor protection system, a problem was encountered with another relay in the B train protection circuit. During performance of SP 47-062B on 9/19/95, a similar condition to that which was suspected to be the trip initiator occurred. One of the steps in the SP requires confirming the "Intermediate Range Blocked" status light is lit when relay IRB1/XB is energized. At this step the status light did not light as required. Corrective actions in response to the lack of indication determined that the electrical circuit for contact 20-24 which provides the indication was not complete. Inspection of the relay contacts could not confirm a mispositioned or misaligned contact. Subsequent cycling of the relay resulted in clearing of the condition.

Based upon the problem encountered during the recent performance of SP 47-062B, and the relay being one of similar design and operating characteristic to those which may have caused the trip, the decision was made to replace any suspect protection relays. Three reactor protection relays were replaced as of 9/26/95. Subsequent bench testing and inspection of the reactor protection relays, which were suspected to have been the initiator of the trip, indicated a contact which was slightly out of alignment.

No other similar events were identified.

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October 5, 1995 10 CFR 50.73

U. S. Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555

Ladies/Gentlemen:

Docket 50-305
Operating License DPR-43
Kewaunee Nuclear Power Plant

Reportable Occurrence 95-005-00

In accordance with the requirements of 10 CFR 50.73, "Licensee Event Report System," the attached Licensee Event Report (LER) for reportable occurrence 95-005-00 is being submitted.

Sincerely

M. L. Marchi
Manager - Nuclear Business Group

GIH

Attach.

cc - INPO Records Center
US NRC Senior Resident Inspector
US NRC, Region III

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